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NIOSH ALERT

JULY 1989

REQUEST FOR ASSISTANCE IN

Preventing Electrocutions of Workers Using Portable Metal Ladders Near Overhead Power Lines

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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National Institute for Occupational Safety and Health

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NIOSH *ALERT*

Request for Assistance In

Preventing Electrocutions of Workers Using Portable Metal Ladders Near Overhead Power Lines

WARNING!

Persons using portable metal or conductive ladders near energized overhead power lines are at risk of electrocution.

The National Institute for Occupational Safety and Health (NIOSH) is requesting assistance in preventing electrocutions that occur when portable metal ladders (including aluminum ladders) contact overhead power lines. Portable metal ladders are used widely in many industries. This *Alert* describes six deaths that occurred because portable aluminum ladders, which are electrical conductors, came in contact with energized overhead power lines. If nonconductive ladders had been used instead, or if safe working clearances had been maintained, these deaths might have been prevented.

Specific Occupational Safety and Health Administration (OSHA) regulations govern the use of portable metal ladders. These regulations should be implemented and enforced by every employer, manager, supervisor, and worker in operations that use portable metal ladders. Editors of appropriate trade journals, safety and health officials, and other persons (especially those in the building trades) are requested to bring the recommendations in this *Alert* to the attention of contractors and workers.

BACKGROUND

Contact between portable metal ladders and overhead power lines causes serious and often fatal injuries to workers in the United States. Data show that during the years 1980 through 1985, the contact of metal ladders with overhead power lines accounted for approximately 4% of all work-related electrocutions in the United States (e.g., 17 out of 382 deaths for 1985) [NIOSH 1988].

REGULATIONS

Safety regulations promulgated by the Occupational Safety and Health Administration (OSHA) establish specific requirements intended to prevent workers from positioning portable metal ladders where they might contact electrical conductors [29 CFR* 1926.450(a)(11) and 1926.951(c)(1)]. These regulations stipulate that "portable metal or conductive ladders shall not be used for electrical work or where they may contact

*Code of Federal Regulations. See CFR in references.

electrical conductors." Other pertinent regulations require that "portable ladders in use shall be tied, blocked, or otherwise secured to prevent their being displaced" [29 CFR 1926.450(a)(10)]. Additional OSHA regulations require employers to instruct each worker to recognize and avoid unsafe conditions [29 CFR 1926.21(b)(2)], and to provide prompt medical attention in case of serious injury [29 CFR 1926.50].

CASE REPORTS

As part of the Fatal Accident Circumstances and Epidemiology (FACE) Program, NIOSH investigated five incidents (resulting in six electrocutions) that occurred between 1985 and 1987 and that involved contact between portable aluminum ladders and overhead power lines.

Case No. 1 - One Fatality

On May 4, 1985, a 28-year-old male worker removed the bottom of a poster on a 12-by-24-foot (-ft) billboard that was scheduled for reposting. He then removed a 24-ft aluminum hook ladder from the service truck. While the worker was positioning the ladder to reach the top section of the billboard, the ladder contacted a 7,200-volt (-V) overhead power line that was located 8 ft from the top of the billboard, and he was electrocuted [NIOSH 1985a].

Case No. 2 - One Fatality

On July 21, 1986, a 27-year-old male painter was standing on a fully extended 24-ft aluminum ladder while painting a rain gutter on an apartment building. After painting a section of the gutter, the worker descended the ladder to move it to a new location. As he was repositioning the ladder, it contacted a 7,200-V overhead power line that was located 8 ft from the gutter, and he was electrocuted [NIOSH 1987d].

Case No. 3 - Two Fatalities

On November 17, 1986, two male painters (20 and 21 years old) were using a 36-ft aluminum extension ladder to paint a 20-ft-high metal light pole. One worker was standing on the ladder painting, and his coworker was on the ground holding the ladder. The ladder slipped away from the pole and contacted a 12,460-V overhead power line that was located within 2 ft of the pole. Both painters were electrocuted [NIOSH 1987c].

Case No. 4 - One Fatality

On September 1, 1987, a 28-year-old male painter and a coworker were using an aluminum extension ladder while cleaning the outside brick wall of a three-story convalescent home before painting. After cleaning one section, the workers moved the ladder to another location. The painter held the base of the ladder as the coworker simultaneously climbed and raised the extension of the 40-ft ladder. When the ladder was extended to approximately 34 ft, it tipped backward, contacting a 7,200-V overhead power line that was located 15 ft from the structure. The coworker on the ladder received an electrical shock and fell to the ground. The painter holding the ladder provided a path to the ground for the electrical current and was electrocuted [NIOSH 1987b].

Case No. 5 - One Fatality

On September 24, 1987, an 18-year-old male construction worker and two coworkers were looking for an area on an office building roof to store shingles. The 18-year-old and a coworker were holding a fully extended, 32-ft aluminum ladder as the other coworker descended it. The ladder tipped backward, contacting a 7,200-V overhead power line that was located 6 ft from the building, electrocuting the 18-year-old worker holding the ladder, and shocking the other two coworkers [NIOSH 1987a].

APPLICATION OF EXISTING REGULATIONS

Data demonstrated that employers and workers in all five fatal incidents violated the following applicable* OSHA regulations:

*Regulation No. 3 did not apply to Case No. 1.

1. Portable metal or conductive ladders shall not be used for electrical work or where they may contact electrical conductors [29 CFR 1926.450(a)(11) or 1926.951(c)(1)].
2. Employers shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury [29 CFR 1926.21(b)(2)].
3. Portable ladders in use shall be tied, blocked, or otherwise secured to prevent their being displaced [29 CFR 1926.450(a)(10)].

Compliance with these regulations might have prevented all five deaths.

CONCLUSIONS

The principal objectives of the NIOSH FACE Program are to identify potential risk factors that may contribute to traumatic worker deaths and to recommend measures that might prevent similar fatalities. Whether or not a work operation complies with existing OSHA regulations is only one variable that may contribute to a fatality. However, in the investigations reported here, full compliance with relevant OSHA regulations would probably have prevented these deaths. The lack of compliance with existing regulations in the five incidents described suggests that many employers and workers may be (1) working unaware of these OSHA regulations, (2) misinterpreting the requirements of the regulations, or (3) failing to inform their workers about the dangers of using metal ladders around overhead power lines.

RECOMMENDATIONS

The following recommendations will help prevent deaths and injuries resulting from contact between metal ladders and overhead power lines:

- NIOSH recommends that employers and workers comply with the OSHA regulation prohibiting the use of portable metal or conductive ladders for electrical work or in locations where they may contact electrical conductors. Nonconductive ladders such as those made of wood or fiber glass should be used instead.

- Employers should fully inform workers about the hazards of using portable metal (including aluminum) ladders near energized power lines.

- If portable metal ladders are used in the vicinity of energized power lines, NIOSH urges that all employers and workers strictly adhere to the OSHA safety regulations [29 CFR 1926.450 and 1926.951(c)(1)] for providing proper balancing and securing of ladders, and for maintaining safe working distances to avoid contact with electrical conductors.

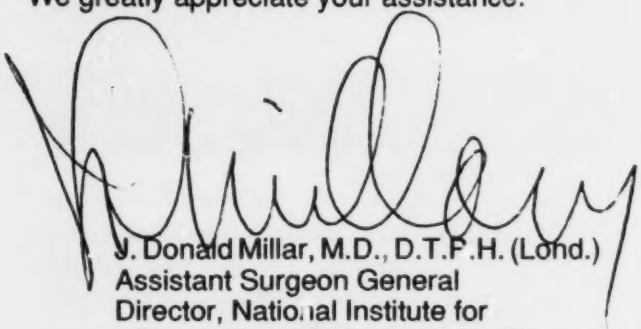
- To assure proper protection for anyone working near electrical power lines, arrangements should be made with the power company to de-energize the lines or to cover the lines with insulating line hoses or blankets.

- Employers should provide workers with training in emergency medical procedures such as cardiopulmonary resuscitation. Fatalities may be prevented by prompt emergency medical care.

NIOSH also urges safety and trade associations, electrical utility companies, product manufacturers, and OSHA State consultative services to bring these recommendations to the attention of employers and workers using portable metal ladders. Further information on electrical energy hazards can be found in six previously published NIOSH *Alerts* [NIOSH 1987e, NIOSH 1986a, NIOSH 1986b, NIOSH 1986c, NIOSH 1985b, NIOSH 1984].

Suggestions, requests for additional information on safe work practices, or questions related to this announcement should be directed to Dr. Thomas R. Bender, Director, Division of Safety Research, 944 Chestnut Ridge Road, Morgantown, West Virginia 26505-2888; telephone (304) 291-4595.

We greatly appreciate your assistance.



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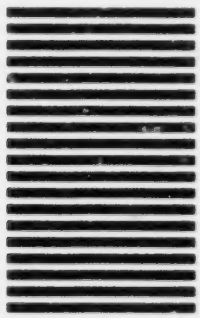

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